

REMARKS

Claim 1 is currently amended. Claims 2 and 6-10 are original. Claim 3 is cancelled without prejudice or disclaimer. Claims 4, 5 and 16-21 were previously cancelled. Claims 11-15 were previously presented. Upon entry of the amendment claims 1, 2 and 6-15 will be active. The amendment to claim 1 is supported by original claim 3. Applicants submit that amended claim 1 was previously considered on the merits; and therefore, applicants respectfully request that the amendment to claim 1 be entered.

The office rejected claims 1-3 and 6-15 under 35 U.S.C. § 103(a) over the combination of Hwang ("A NOVEL ORGANIC BOTTOM ANTI-REFLECTIVE COATING MATERIAL FOR 193 nm EXCIMER LASER LITHOGRAPHY", Polymer 41 (2000) pg. 6691-6694) and Pavelcheck (US 6,767,689). Applicants submit that the claimed composition would not have been rendered unpatentable over the cited references because applicants have rebutted any *prima facie* case of obviousness with a showing of unexpected or superior results (MPEP 2144.09 VII).

The disclosure relates to an organic anti-reflective composition containing a crosslinking agent of formula 1, a light absorbing compound of formula 3, a thermal acid generator of formula 4, an organic solvent, and an adhesivity enhancer of formula 2.

The claimed composition containing the claimed adhesivity enhancer provided for unexpected improved or superior properties over previously disclosed anti-reflective compositions. Specifically, the claimed composition gives an unexpectedly superior pattern shape; and therefore, these unexpected results rebut any *prima facie* case of obviousness.

Hwang describes an anti reflective coating material that utilizes polyvinylphenol as a UV-absorber and a norbornene-based polymer as a resist polymer (Fig. 1). Pavelcheck describes an anthracene-containing ARC polymer (example 1). The office concludes that the claimed composition would have been obvious over the combination of Hwang and Pavelcheck.

Applicants submit that any cases of obviousness has been rebutted by a showing of unexpected or superior results. Applicants emphasizes, as noted above, that the unexpected or superior results for the claimed anti-reflective composition arise from the combination of the light absorbing agent of formula 3 and the adhesivity enhancer of formula 1. None of the cited references teach or suggest the efficacy of the compound of formula 1 as adhesivity enhancing

agent. Applicants submit that this discovery combined with the showing of superior results clearly demonstrates a showing of unexpected or superior results.

In the office action dated August 19, 2008, the office concluded that the results shown in table 1 were not persuasive in showing unexpected or superior results because:

- 1) different amounts of crosslinking agent are used for the examples and comparative examples
- 2) the thickness of the coating is different between the examples and comparative examples and
- 3) the use of the crosslinking agent of formula 2a makes the comparison not commensurate in scope with claim 1.

With regard to item 3) above, applicants submit that the amendment to claim 1 makes this point moot. Applicants submit that the results are commensurate in scope with claim 1.

With regard to item 2) above, applicants submit that the examples and comparative examples essentially have the same thickness of the coating. The three examples have thicknesses of 585-592 Å (588 Å average) and the three comparative examples have a thickness of 580-597 Å (588 Å average). These ranges represent a spread of less than 3 % and a average of less than 1 %; and therefore, these thicknesses are essentially the same within experimental error.

With regard to item 1) above, applicants respectfully request that the office evaluate the composition of the examples and comparative examples in light of the goal of the invention which was to improve the pattern shape. The data in table 1 and the figures demonstrate this goal was achieved (i.e. no pattern collapse versus pattern collapse, see p. 17 of the specification for further discussion). In the example experiments, applicants replaced some of the crosslinking agent in comparative examples 1-3 with the claimed adhesivity enhancer. For example, in example 2 the total amount of crosslinking agent and adhesivity enhancer was 0.36 g which is the same amount of the crosslinking agent (0.36 g) used in comparative example 1. The replacement of some of the crosslinking agent with the adhesivity enhancer resulted in an unexpectedly improved pattern due to the adhesivity enhancer of formula 1. Applicants submit that these experiments are a fair comparison relative to known compositions and the results demonstrate the unexpected improvement in pattern properties of the claim composition. Again applicants emphasize that the improvement arises from the combination of the crosslinking agent,

the light absorbing compound, the acid generator and the adhesivity enhancer. Applicants further submit that this improvement in pattern properties would not have been predictable based on the cited references. As the court in KSR (KSR int'l co v. Teleflex Inc., 127 S. Ct. 117c7) noted, if the elements work together in an unexpected and fruitful manner then the invention is not obvious to those skilled in the art.

Applicants submit that any *prima facie* case of obviousness has been rebutted with a showing of unexpected or superior results. Accordingly, applicants respectfully request that the office withdraw the rejection of claims 1, 2 and 6-15 under 35 U.S. § 103(a) over the combination of Hwang and Pavelcheck.

In light of the remarks above, applicants submit the application is in condition for allowance. Favorable reconsideration is respectfully requested.

Respectfully submitted,

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